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2.	Patent application number (The Patent Office will fill in this part)	0226380.4			
3.	Full name, address and postcode of the or of each applicant (underline all surnames)	UNILEVER PLC UNILEVER HOUSE, BLACKFRIARS LONDON, EC4P 4BQ			
	Patents ADP number (if you know it)	50426956002 1628002			
	If the applicant is a corporate body, give the country/state of its incorporation	UNITED KINGDOM			
4.	Title of the invention	COMPOSITIONS FOR WASHING AND CONDITIONING HAIR			
5.	Name of your agent (if you have one)	ELLIOTT Peter William			
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Signature(s) Leonie Watkinson Date: 12/11/02
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COMPOSITIONS FOR WASHING AND CONDITIONING HAIRTechnical Field

5

The invention is concerned with rinse-off hair-conditioning compositions which are applied to the hair or body and then substantially rinsed away. It is particularly concerned with hair shampoo compositions and shower gels, which both
10 clean the hair and provide conditioning benefit to the hair. More specifically, it is concerned with hair-washing compositions which have the effect of straightening the hair and reducing the volume and fluffiness of the hair.

15 Background and Prior Art

Compositions which provide a combination of cleansing and conditioning to the hair are known in the art. Such shampoo or shower-gel compositions typically comprise one or more
20 surfactants for shampooing or cleansing purposes and one or more conditioning agents. The purpose of the conditioning agent is to make the hair easier to comb when wet and more manageable when dry, e.g. less static and fly-away. Typically, these conditioning agents are water-insoluble
25 oily materials, cationic polymers or cationic surfactants.

Certain consumers desire low volume hair after washing. By low volume is meant that the hairs lie substantially straight and mutually parallel, trapping little air and
30 leading to low hair volume, fluffiness or frizziness. In order to achieve this effect, such consumers may apply oils

to the hair after washing. This gives the required low volume, but at the expense of requiring a two-step washing and conditioning process. Moreover the oil remains in the hair until the next wash, making it feel greasy and heavy.

5 Other consumers may use hot air dryers to straighten their hair after washing in order to achieve the effect of straight hair and a low volume hair style.

10 There is a need for a hair-washing composition which achieves the effect of low volume, low fluffiness, straightened hair after washing and natural drying, without the need for applying oils to the hair after washing.

15 It is known to incorporate cationic polymers in hair-washing compositions. For instance. US 6,444,628 discloses an aqueous shampoo comprising, in addition to water, an anionic cleansing surfactant, a cationic polymer and a monoalkyl quaternary ammonium compound.

20 Such cationic polymers are often used in combination with water-insoluble conditioning oils in order to improve the deposition of the conditioning oils onto the hair. US Patent 3,753,916 discloses the use of cationic polymers as deposition aids.

25 It has now been found that by using a specific combination of cationic polymers in a hair-washing compositions, a surprising benefit in hair straightening and reduction in hair style volume can be achieved. This benefit is achieved
30 without the need to use oils in the compositions. Nor is it necessary to apply oils to the hair either directly or from

post-wash hair conditioning compositions in order to achieve low volume hair with low fluffiness.

Detailed Description of the Invention

5

In a first aspect, the invention is concerned with a hair-washing composition comprising

10

a) from 0.5 to 40 percent by weight of a cleansing surfactant,

15

b) from 0.05 to 0.5% by weight of a first cationic polymer having a mean charge density at pH7 from 0.2 to 1.0 meq per gram,

c) from 0.05 to 0.5% by weight of a second cationic polymer having a mean charge density at pH7 from 1.3 to 3.0 meq per gram and

20

d) water.

Cleansing Surfactant

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Compositions according to the invention comprise one or more cleansing surfactants which are cosmetically acceptable and suitable for topical application to the hair. Further surfactants may be present as an additional ingredient if sufficient for cleansing purposes is not provided by the emulsifier for the water-insoluble oily component.

30

Suitable cleansing surfactants, which may be used singularly or in combination, are selected from anionic, nonionic, amphoteric and zwitterionic surfactants, and mixtures thereof.

5

Anionic Cleansing Surfactant

Shampoo compositions according to the invention will typically comprise one or more anionic cleansing surfactants which are cosmetically acceptable and suitable for topical application to the hair.

Examples of suitable anionic cleansing surfactants are the alkyl sulphates, alkyl ether sulphates, alkaryl sulphonates, alkanoyl isethionates, alkyl succinates, alkyl sulphosuccinates, N-alkyl sarcosinates, alkyl phosphates, alkyl ether phosphates, alkyl ether carboxylates, and alpha-olefin sulphonates, especially their sodium, magnesium, ammonium and mono-, di- and triethanolamine salts. The alkyl and acyl groups generally contain from 8 to 18 carbon atoms and may be unsaturated. The alkyl ether sulphates, alkyl ether phosphates and alkyl ether carboxylates may contain from 1 to 10 ethylene oxide or propylene oxide units per molecule.

25

Typical anionic cleansing surfactants for use in shampoo compositions of the invention include sodium oleyl succinate, ammonium lauryl sulphosuccinate, ammonium lauryl sulphate, sodium dodecylbenzene sulphonate, triethanolamine dodecylbenzene sulphonate, sodium cocoyl isethionate, sodium lauryl isethionate and sodium N-lauryl sarcosinate. The most

30

preferred anionic surfactants are sodium lauryl sulphate, sodium lauryl ether sulphate(n)EO, (where n ranges from 1 to 3), ammonium lauryl sulphate and ammonium lauryl ether sulphate(n)EO, (where n ranges from 1 to 3).

5

Mixtures of any of the foregoing anionic cleansing surfactants may also be suitable.

10 The total amount of anionic cleansing surfactant in shampoo compositions of the invention is generally from 0.5 to 45, preferably from 1.5 to 35, more preferably from 5 to 20 percent by weight of the composition.

Co-surfactant

15

The composition can include co-surfactants, to help impart aesthetic, physical or cleansing properties to the composition.

20 A preferred example is an amphoteric or zwitterionic surfactant, which can be included in an amount ranging from 0 to about 8, preferably from 1 to 4 percent by weight.

25 Examples of amphoteric and zwitterionic surfactants include alkyl amine oxides, alkyl betaines, alkyl amidopropyl betaines, alkyl sulphobetaines (sultaines), alkyl glycinate, alkyl carboxyglycinates, alkyl amphopropionates, alkylamphoglycinates, alkyl amidopropyl hydroxysultaines, acyl taurates and acyl glutamates, wherein the alkyl and acyl
30 groups have from 8 to 19 carbon atoms. Typical amphoteric and zwitterionic surfactants for use in shampoos of the

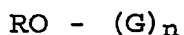
invention include lauryl amine oxide, cocodimethyl sulphopropyl betaine and preferably lauryl betaine, cocamidopropyl betaine and sodium cocamphopropionate.

- 5 Another preferred example is a nonionic surfactant, which can be included in an amount ranging from 0 to 8, preferably from 2 to 5 percent by weight of the composition.

For example, representative nonionic surfactants that can be
10 included in shampoo compositions of the invention include condensation products of aliphatic (C₈-C₁₈) primary or secondary linear or branched chain alcohols or phenols with alkylene oxides, usually ethylene oxide and generally having from 6 to 30 ethylene oxide groups.

15 Other representative nonionic surfactants include mono- or di-alkyl alkanolamides. Examples include coco mono- or di-ethanolamide and coco mono-isopropanolamide.

20 Further nonionic surfactants which can be included in shampoo compositions of the invention are the alkyl polyglycosides (APGs). Typically, the APG is one which comprises an alkyl group connected (optionally via a bridging group) to a block of one or more glycosyl groups. Preferred APGs are defined
25 by the following formula:



wherein R is a branched or straight chain alkyl group which
30 may be saturated or unsaturated and G is a saccharide group.

R may represent a mean alkyl chain length of from about C₅ to about C₂₀. Preferably R represents a mean alkyl chain length of from about C₈ to about C₁₂. Most preferably the value of R lies between about 9.5 and about 10.5. G may be selected
5 from C₅ or C₆ monosaccharide residues, and is preferably a glucoside. G may be selected from the group comprising glucose, xylose, lactose, fructose, mannose and derivatives thereof. Preferably G is glucose.

10 The degree of polymerisation, n, may have a value of from about 1 to about 10 or more. Preferably, the value of n lies in the range of from about 1.1 to about 2. Most preferably the value of n lies in the range of from about 1.3 to about 1.5.

15 Suitable alkyl polyglycosides for use in the invention are commercially available and include for example those materials identified as: Oramix NS10 ex Seppic; Plantaren 1200 and Plantaren 2000 ex Henkel.

20 Other sugar-derived nonionic surfactants which can be included in compositions of the invention include the C₁₀-C₁₈ N-alkyl (C₁-C₆) polyhydroxy fatty acid amides, such as the C₁₂-C₁₈ N-methyl glucamides, as described for example in
25 WO 92 06154 and US 5 194 639, and the N-alkoxy polyhydroxy fatty acid amides, such as C₁₀-C₁₈ N-(3-methoxypropyl) glucamide.

The composition according to the invention can also optionally include one or more cationic co-surfactants included in an amount from 0.01 to 10, more preferably from 0.05 to 5, most preferably from 0.05 to 2 percent by weight of the composition.

The total amount of cleansing surfactant (including any co-surfactant, and/or any emulsifier) in compositions of the invention is generally from 1 to 50, preferably from 2 to 40, more preferably from 10 to 25 percent by weight of the composition.

A preferred blend of cleansing surfactants is a combination of ammonium lauryl ether sulphate, ammonium lauryl sulphate, PEG 5 cocamide and cocamide MEA (CTFA designations).

Cationic Polymer

A combination of two cationic polymers is essential to compositions of the invention for providing the benefit of hair straightening and reduction in volume of hair style.

The first cationic polymer suitably has a mean charge density at pH7 from 0.2 to 1.0 meq per gram, preferably from 0.5 to 0.9 meq per gram. The first cationic polymer suitably has a mean molecular weight M_w from 5 000 to 10 000 000 unified atomic mass units, preferably from 100 000 to 2 000 000. Although the cationic polymers listed below can suitably be used, it is preferred if the first cationic polymer is a cationically substituted polysaccharide, more preferably a

cationically substituted guar gum or a cationically substituted hydroxyethyl cellulose ether.

5 The second cationic polymer suitably has a mean charge density at pH7 from 1.3 to 3.0 meq per gram, preferably from 1.5 to 2.0 meq per gram. The second cationic polymer suitably has a mean molecular weight M_w from 5 000 to 10 000 000 unified atomic mass units, preferably from 100 000 to 2 000 000. Although the cationic polymers listed below can
10 suitably be used, it is preferred if the second cationic polymer is a cationically substituted polysaccharide, more preferably a cationically substituted guar gum or a cationically substituted hydroxyethyl cellulose ether.

15 It is more preferred if both the first and the second cationic polymers are both cationically substituted guar gums.

20 The charge density on the cationic polymer can be measured using the Kjeldahl method and should be the value at pH7. Information concerning the charge density and the mean molecular weight of cationic polymers is generally available from commercial suppliers of such polymers.

Either the first or the second cationic polymer may be a homopolymer or be formed from two or more types of monomers. The molecular weight of the polymer will generally be between 5 000 and 10 000 000 Dalton, typically at least 10 000 and preferably in the range 100 000 to about 2 000 000. The polymers will have cationic nitrogen containing groups such

as quaternary ammonium or protonated amino groups, or a mixture thereof.

The cationic nitrogen-containing group will generally be present as a substituent on a fraction of the total monomer units of the cationic polymer. Thus when the polymer is not a homopolymer it can contain spacer non-cationic monomer units. Such polymers are described in the CTFA Cosmetic Ingredient Directory, 3rd edition. The ratio of the cationic to non-cationic monomer units is selected to give a polymer having a cationic charge density in the required range for the first and second cationic polymer respectively.

Suitable cationic conditioning polymers include, for example, copolymers of vinyl monomers having cationic amine or quaternary ammonium functionalities with water soluble spacer monomers such as (meth)acrylamide, alkyl and dialkyl (meth)acrylamides, alkyl (meth)acrylate, vinyl caprolactone and vinyl pyrrolidine. The alkyl and dialkyl substituted monomers preferably have C1-C7 alkyl groups, more preferably C1-3 alkyl groups. Other suitable spacers include vinyl esters, vinyl alcohol, maleic anhydride, propylene glycol and ethylene glycol.

The cationic amines can be primary, secondary or tertiary amines, depending upon the particular species and the pH of the composition. In general secondary and tertiary amines, especially tertiary, are preferred.

Amine substituted vinyl monomers and amines can be polymerized in the amine form and then converted to ammonium by quaternization.

Cationic polymers can comprise mixtures of monomer units derived from amine- and/or quaternary ammonium-substituted monomer and/or compatible spacer monomers.

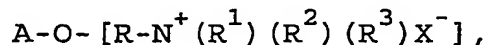
Suitable cationic polymers include, for example:

- copolymers of 1-vinyl-2-pyrrolidine and 1-vinyl-3-methyl-imidazolium salt (e.g. chloride salt), referred to in the industry by the Cosmetic, Toiletry, and Fragrance Association, (CTFA) as Polyquaternium-16. This material is commercially available from BASF Wyandotte Corp. (Parsippany, NJ, USA) under the LUVIQUAT tradename (e.g. LUVIQUAT FC 370);
- copolymers of 1-vinyl-2-pyrrolidine and dimethylaminoethyl methacrylate, referred to in the industry (CTFA) as Polyquaternium-11. This material is available commercially from Gaf Corporation (Wayne, NJ, USA) under the GAFQUAT tradename (e.g., GAFQUAT 755N);
- cationic diallyl quaternary ammonium-containing polymers including, for example, dimethyldiallylammonium chloride homopolymer and copolymers of acrylamide and dimethyldiallylammonium chloride, referred to in the industry (CTFA) as Polyquaternium 6 and Polyquaternium 7, respectively;

- mineral acid salts of amino-alkyl esters of homo-and co-polymers of unsaturated carboxylic acids having from 3 to 5 carbon atoms, (as described in U.S. Patent 4,009,256);
- cationic polyacrylamides (as described in WO95/22311).

Other cationic conditioning polymers that can be used include cationic polysaccharide polymers, such as cationic cellulose derivatives, cationic starch derivatives, and cationic guar gum derivatives.

Cationic polysaccharide polymers suitable for use in compositions of the invention include those of the formula:



wherein: A is an anhydroglucose residual group, such as a starch or cellulose anhydroglucose residual. R is an alkylene, oxyalkylene, polyoxyalkylene, or hydroxyalkylene group, or combination thereof. R^1 , R^2 and R^3 independently represent alkyl, aryl, alkylaryl, arylalkyl, alkoxyalkyl, or alkoxyaryl groups, each group containing up to about 18 carbon atoms. The total number of carbon atoms for each cationic moiety (i.e., the sum of carbon atoms in R^1 , R^2 and R^3) is preferably about 20 or less, and X is an anionic counterion.

Cationic cellulose is available from Amerchol Corp. (Edison, NJ, USA) in their Polymer JR (trade mark) and LR (trade mark) series of polymers, as salts of hydroxyethyl

cellulose reacted with trimethyl ammonium substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 10. Another type of cationic cellulose includes the polymeric quaternary ammonium salts of hydroxyethyl cellulose reacted with lauryl dimethyl ammonium-substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 24. These materials are available from Amerchol Corp. (Edison, NJ, USA) under the tradename Polymer LM-200.

Other suitable cationic polysaccharide polymers include quaternary nitrogen-containing cellulose ethers (e.g. as described in U.S. Patent 3,962,418), and copolymers of etherified cellulose and starch (e.g. as described in U.S. Patent 3,958,581).

A particularly suitable type of cationic polysaccharide polymer that can be used is a cationic guar gum derivative, such as guar hydroxypropyltrimonium chloride (commercially available from Rhone-Poulenc in their JAGUAR trademark series).

Examples are JAGUAR C13S, which has a low degree of substitution of the cationic groups and high viscosity. This polymer has a charge density of 0.8 meq/gram at pH7 and a molecular weight of 2 00 000 and is suitable as the first cationic polymer.

JAGUAR C17 has a high degree of substitution leading to a charge density of 1.6 meq/gram at pH7. It also has a mean

molecular weight M_w of 2 00 000 and is suitable as the second cationic polymer.

The first cationic polymer will generally be present in compositions of the invention at levels of from 0.05 to 0.5, preferably from 0.1 to 0.4, more preferably from 0.15 to 0.3 percent by weight of the composition.

5 The second cationic polymer will generally be present in compositions of the invention at levels of from 0.05 to 0.5, preferably from 0.1 to 0.4, more preferably from 0.15 to 0.3 percent by weight of the composition.

10 Aqueous Compositions

In addition to the cleansing surfactant and the cationic polymers, compositions according to the invention
15 additionally comprise water. Suitably most of the remainder of the composition is made up of water. Suitably compositions according to the invention comprise 40 or more, preferably 50 or more, more preferably 60 or more percent by weight of water.

20 Other ingredients

Compositions according to the invention may additionally contain other ingredients suitable for use in hair cleansing
25 and conditioning compositions. Hydrophobic, water-insoluble conditioning oils may be included.

This may be a non-silicone hydrophobic oil but is more preferably a silicone conditioning agent. By water insoluble it is meant that the material has a solubility in water of 0.1% or less by weight of water at 25°C.

- 5 Preferably the silicone conditioning agent is non-volatile, meaning that it has a vapour pressure of less than 1000 Pa at 25°C. The conditioning oil is present in the composition as discrete emulsion droplets.

10 Silicone Conditioning Agents

The compositions of the invention can contain, emulsified droplets of a silicone conditioning agent, for enhancing conditioning performance.

15

- Suitable silicones include polydiorganosiloxanes, in particular polydimethylsiloxanes which have the CTFA designation dimethicone. Also suitable for use compositions of the invention (particularly shampoos and conditioners) are polydimethyl siloxanes having hydroxyl end groups, which have the CTFA designation dimethiconol. Also suitable for use in compositions of the invention are silicone gums having a slight degree of cross-linking, as are described for example in WO 96/31188.

25

The viscosity of the silicone itself (not the emulsion or the final hair conditioning composition) is typically in the range from 350 to 10,000,000 $\text{mm}^2\text{sec}^{-1}$ at 25°C. Preferably the viscosity is at least 5,000 $\text{mm}^2\text{sec}^{-1}$ at 25 °C, more

- 16 -

preferably at least $10,000 \text{ mm}^2 \text{ sec}^{-1}$. Preferably the viscosity does not exceed $500,000 \text{ mm}^2 \text{ sec}^{-1}$.

Viscosity of silicones can be measured using a glass
5 capillary viscometer as set out in Dow Corning corporate test method CTM004 July 20, 1970 at 25°C.

A further preferred class of silicones for inclusion in compositions of the invention are amino functional
10 silicones. By "amino functional silicone" is meant a silicone containing at least one primary, secondary or tertiary amine group, or a quaternary ammonium group. Examples of suitable amino functional silicones include: polysiloxanes having the CTFA designation "amodimethicone",
15 Specific examples of amino functional silicones suitable for use in the invention are the aminosilicone oils DC2-8220, DC2-8166, DC2-8466, and DC2-8950-114 (all ex Dow Corning), and GE 1149-75, (ex General Electric Silicones).

20 Suitable quaternary silicone polymers are described in EP-A-0 530 974. A preferred quaternary silicone polymer is K3474, ex Goldschmidt.

It is preferred to use a combination of amino and non amino
25 functional silicones

The total amount of silicone is preferably from 0.01% to 10 % by weight of the total composition more preferably from 0.1% to 5%, most preferably 0.5% to 3%.

The silicones may be added to the composition as a fluid and subsequently emulsified, but preferably are added as pre-formed emulsions for ease of processing. Preferably, the pre-formed silicone emulsions additionally comprise a
5 suitable emulsifier such as dodecylbenzenesulphonic acid, or are emulsified using the Poloxamer as the emulsifier.

Non-silicone Hydrophobic Conditioning Oil

10 Compositions according to the present invention may comprise a dispersed, non-volatile, water-insoluble oily non-silicone conditioning agent.

Suitable oily or fatty materials are selected from
15 hydrocarbon oils, fatty esters and mixtures thereof.

Straight chain hydrocarbon oils will preferably contain from about 12 to about 30 carbon atoms. Also suitable are polymeric hydrocarbons of alkenyl monomers, such as C2-C6
20 alkenyl monomers.

Specific examples of suitable hydrocarbon oils include paraffin oil, mineral oil, saturated and unsaturated dodecane, saturated and unsaturated tridecane, saturated and
25 unsaturated tetradecane, saturated and unsaturated pentadecane, saturated and unsaturated hexadecane, and mixtures thereof. Branched-chain isomers of these compounds, as well as of higher chain length hydrocarbons, can also be used. Another suitable material is
30 polyisobutylene.

- Suitable fatty esters are characterised by having at least 10 carbon atoms, and include esters with hydrocarbonyl chains derived from fatty acids or alcohols, Monocarboxylic acid esters include esters of alcohols and/or acids of the
- 5 formula $R'COOR$ in which R' and R independently denote alkyl or alkenyl radicals and the sum of carbon atoms in R' and R is at least 10, preferably at least 20. Di- and trialkyl and alkenyl esters of carboxylic acids can also be used.
- 10 Particularly preferred fatty esters are mono-, di- and triglycerides, more specifically the mono-, di-, and tri-esters of glycerol and long chain carboxylic acids such as C1-C22 carboxylic acids. Preferred materials include cocoa butter, palm stearin, sunflower oil, soyabean oil and
- 15 coconut oil.

Preferably, the viscosity of the conditioning oil itself (not the emulsion or the final hair conditioning composition) is in the range from 350 to 10,000,000 $\text{mm}^2\text{sec}^{-1}$

20 at 25°C. More preferably the viscosity is at least 5,000 $\text{mm}^2\text{sec}^{-1}$ at 25 °C, most preferably at least 10,000 $\text{mm}^2\text{sec}^{-1}$. Preferably the viscosity does not exceed 500,000 $\text{mm}^2\text{sec}^{-1}$.

The oily or fatty material is suitably present at a level of

25 from 0.05 to 20, preferably from 0.2 to 10, more preferably from about 0.5 to 5 percent by weight of the composition.

Suspending Agents

Compositions according to the invention may further comprise from 0.1 to 10 percent by weight, preferably from 0.6% to 5 6%, of a suspending agent. Suitable suspending agents are selected from polyacrylic acids, cross-linked polymers of acrylic acid, copolymers of acrylic acid with a hydrophobic monomer, copolymers of carboxylic acid-containing monomers and acrylic esters, cross-linked copolymers of acrylic acid 10 and acrylate esters, heteropolysaccharide gums and crystalline long chain acyl derivatives. The long chain acyl derivative is desirably selected from ethylene glycol stearate, alkanolamides of fatty acids having from 16 to 22 carbon atoms and mixtures thereof. Ethylene glycol 15 distearate and polyethylene glycol 3 distearate are preferred long chain acyl derivatives. Polyacrylic acid is available commercially as Carbopol 420, Carbopol 488 or Carbopol 493. Polymers of acrylic acid cross-linked with a polyfunctional agent may also be used, they are available 20 commercially as Carbopol 910, Carbopol 934, Carbopol 940, Carbopol 941 and Carbopol 980. An example of a suitable copolymer of a carboxylic acid containing a monomer and acrylic acid esters is Carbopol 1342. All Carbopol (trade mark) materials are available from Goodrich.

25 Suitable cross-linked polymers of acrylic acid and acrylate esters are Pemulen TR1 or Pemulen TR2. A suitable heteropolysaccharide gum is xanthan gum, for example that available as Kelzan mu.

Adjuvants

The compositions of the present invention may also contain adjuvants suitable for hair care. Generally such

5 ingredients are included individually at a level of up to 2%, preferably up to 1 wt% of the total composition.

Among suitable hair care adjuvants, are natural hair root nutrients, such as amino acids and sugars. Examples of
10 suitable amino acids include arginine, cysteine, glutamine, glutamic acid, isoleucine, leucine, methionine, serine and valine, and/or precursors and derivatives thereof. The amino acids may be added singly, in mixtures, or in the form of peptides, e.g. di- and tripeptides. The amino acids may
15 also be added in the form of a protein hydrolysate, such as a keratin or collagen hydrolysate. Suitable sugars are glucose, dextrose and fructose. These may be added singly or in the form of, e.g. fruit extracts. A particularly preferred combination of natural hair root nutrients for
20 inclusion in compositions of the invention is isoleucine and glucose. A particularly preferred amino acid nutrient is arginine. Another suitable adjuvant is glycolic acid.

Mode of Use

25

The compositions of the invention are primarily intended for topical application to the hair and/or scalp of a human subject in rinse-off compositions, in order to provide cleansing while additionally providing the benefit of

30 improved hair straightness and reduced volume of hair style.

In order to achieve the benefit it is not necessary to dry

the hair using a heated air hair-drying apparatus, and it is preferred if the hair is allowed to dry naturally after towelling and brushing

- 5 The invention is further demonstrated with reference to the following, non-limiting examples:

Examples

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Table 1

Chemical name	Trade Name	Supplier	weight % of chemical		
			A	B	1
Sodium laureth (2 EO) sulphate	Empicol ESB70	Albright & Wilson	14	14	14
Coco amidopropyl betaine	Tegobetaine CK	Goldschmidt	2	2	2
Guar Hydroxypropyl Trimonium Chloride	Jaguar C13S	Rhone Poulenc	0.4	-	0.2
Guar Hydroxypropyl Trimonium Chloride.	Jaguar C17	Rhone Poulenc	-	0.4	0.2
Ethylene Glycol Distearate	PK3000AM	COGNIS	1	1	1
Formaldehyde	Formalin	Mallinkropt	0.1	0.1	0.1
Water	-	-	to 100	to 100	to 100

- Shampoo compositions were made up according to compositions of columns A, B and 1 of table 1. Example 1 is a composition according to the invention whereas examples A and B are comparative examples.
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2g of 25 cm long Asian hair switches were degreased using diethyl ether and rinsed in water. Using 5 switches per treatment, 0.2 ml of each of the shampoo compositions (either A, B or 1) was spread along the length of the switch and agitated for 30 seconds, followed by a rinse for 30 seconds. The washing process was repeated again using 0.2 ml of shampoo placed along the length of the switch and agitated for 30 seconds, followed by a rinse in water for 1 minute. The switches were combed through whilst suspended vertically from a clamp stand, then rinsed with a spray of water from a water bottle. The switches were then allowed to dry naturally overnight.

After drying, each switch was suspended vertically from a clamp stand and a 2 mW, 632.8 nanometre wavelength Helium-Neon laser shone perpendicular to the untouched switch, 5 cm from the bottom of the switch, and the illuminated image recorded onto an optical disc using a 35mm camera.

Image analysis was carried out on the resulting image to estimate the spread of each hair switch 5 cm from the bottom of each switch (expressed as mean radial distribution in mm). The smaller the value for the spread, the lower the apparent volume of the switch and the greater the straightness of the fibres.

The mean results obtained for the radial distribution were:

A: 17.3 mm

B: 15.8 mm

1: 14.8 mm

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Hence composition 1, with a first and a second cationic polymer according to the invention, provides significantly reduced volume and improved straightness over the comparative examples A and B, which have the same weight
5 percent of a single cationic polymer.

CLAIMS

1. A hair-washing composition comprising
 - 5 a) from 1 to 50 percent by weight of a cleansing surfactant,
 - b) from 0.05 to 0.5% by weight of a first cationic polymer having a mean charge density at pH7 from 0.2
10 to 1.0 meq per gram,
 - c) from 0.05 to 0.5% by weight of a second cationic polymer having a mean charge density at pH7 from 1.3
15 to 3.0 meq per gram and
 - d) water.
2. A composition according to claim 1 wherein the first and
20 second cationic polymers are cationically substituted polysaccharides.
3. A composition according to claim 2 wherein the
25 polysaccharides are selected from guar gums, celluloses and hydroxyethyl celluloses.
4. A composition according to claim 1 wherein both the
first and second cationic polymers are cationically substituted guar gums.
- 30 5. A composition according to any preceding claim wherein the cleansing surfactant is selected from the group

consisting of anionic surfactants; amphoteric surfactants, zwitterionic surfactants, nonionic surfactants and mixtures thereof.

- 5 6. A method of reducing the volume and fluffiness of hair comprising washing the hair with a composition according to any preceding claim followed by drying the hair.
- 10 7. A method of straightening the hair comprising washing the hair with a composition according to any preceding claim followed by drying the hair.
- 15 8. The use of compositions according to any of claims 1 to 5 for reducing the volume and fluffiness of hair.
9. The use of compositions according to any of claims 1 to 5 for straightening hair.

ABSTRACT

A hair-washing composition, for straightening the hair and reducing volume after washing and drying, comprising

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a) from 1 to 50 percent by weight of a cleansing surfactant,

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b) from 0.05 to 0.5% by weight of a first cationic polymer having a mean charge density at pH7 from 0.2 to 1.0 meq per gram,

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c) from 0.05 to 0.5% by weight of a second cationic polymer having a mean charge density at pH7 from 1.3 to 3.0 meq per gram and

d) water.

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